

Prototype Training Materials for Acceptance Criteria of Maintenance ASAP Events
Occurring Within Social Context
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Introduction

In recent years, maintenance organizations have been interested in increasing their ability to learn from the investigation and analysis of incident and accident events. However, they have found it difficult to move from the compliance-based traditional mode of error management, to more voluntary (and less punishment oriented) participatory investigation programs. David Marx has coined the useful terms “rule-based” and “risk-based” to refer to these two modes of error management (2001).

The aviation maintenance community is at a crossroads with respect to implementing the Aviation Safety Action Program (ASAP). While there is considerable interest, several key issues have emerged that cast doubt on how to assure a successful implementation, including buy-in from all levels of the company and training for key participants. There are two objectives for the present report. The first is to provide an examination of limits (or more properly, examples) of the degree of acceptability of more problematic events for risk-based decisions within the current ASAP guidelines. The second objective is to apply these limits of “community standards” to a set of further refined ASAP training scenarios.

In part, a successful maintenance ASAP implementation depends on a robust Memorandum of Understanding (MOU) and Event Review Committee (ERC) process,

both of which require clear criteria for deciding whether individual cases are accepted or excluded. Potential inconsistencies brought about by differences in rule-based vs. risk-based philosophies need to be resolved so all key participants share a formalized, common, understanding. Training materials consistent with community standards of acceptable ASAP events should help form more readily enunciated criteria for improving present practice, as well as improving diffusion of further programs

Exploring reject/accept criteria.

Embedded within the current ASAP guidelines, as described in AC 120-66B (FAA, 2002), are a number of criteria for excluding a submission to the program. Among these are rule-based criteria such as an untimely report (one submitted beyond a pre-set time limit unless it is a sole source report), a violation committed while abusing controlled substances or alcohol, or a violation committed while engaged in criminal activity. There are also “risk-based” criteria to be found in AC 120-66B, which can be subsumed within the construct, “intentional (or ‘not inadvertent’) disregard for safety.” There are no fixed definitions or unequivocal boundaries for intentional/unintentional disregard for safety. Deciding that the reporter’s action was unintentional with regard to safety is a matter of consensus for an ERC operating under an approved ASAP MOU. The ERC, when the members decide to accept a report under ASAP protection, in fact acknowledges the risk or uncertainty that the reporter did not purposefully disregard safety. Both rule-based and risk-based allusions found within AC 120-66B will make their way into the MOU of any ASAP program, where they will henceforth be applied by the ERC that created them.

The impact of sole source reports in Maintenance ASAP. According to AC 120-66B if an excluded sole source report (i.e. all evidence of the event is based or predicted upon the report) is referred to the FAA, the agency would have no basis for enforcement action because it would have no independent evidence. Similarly a company cannot use an excluded sole source report as a basis for company discipline. On the other hand, those reports submitted to a Maintenance ASAP ERC that are excluded, and are not sole source, may be subject to legal enforcement action. When this is the case the FAA enforcement or company disciplinary action can only be taken based on independent evidence of the event (i.e., evidence not based or predicated on the report itself). Thus punishment is unlikely if a mechanic unsuccessfully reports what he/she believes is an unintentional error.

There is a complication however. In aircraft maintenance (though unlikely in flight operations) the possibility exists that there will be independent evidence of the reported event, which is at least available to the company, though not necessarily to the FAA. Thus it is possible that a mechanic reporting an error that is excluded from ASAP might be subject to punishment if and when additional evidence for that error becomes available.

Risk-based approach to protected disclosure in Maintenance ASAP. Any ERC exploring risk-based cases must rely on their operational definition of what is acceptable and what should be excluded. The added complication of possible punishment for those maintenance personnel whose report may be excluded -- even though presumed sole-source -- must be considered. Risk-based decisions must therefore take the special nature of maintenance errors into account.

In the case of excluded cases the ERC may find it difficult to define or apply a definition of ‘intentional disregard for safety,’ but they “will know it when they see it” (acknowledging the words of Supreme Court Justice Potter Stewart).

In 1964, Justice Potter Stewart tried to explain "hard-core" pornography, or what is obscene, by saying, "I shall not today attempt further to define the kinds of material I understand to be embraced . . . [b]ut I know it when I see it . . . " (Jacobellis v. Ohio, 378 U.S. 184, 197; 1964). This quote, and the intent behind it, is well known as summarizing the irony and difficulty in trying to define the concept of “obscenity.” For Maintenance ERCs considering a risk-based approach to aviation safety investigations, “intentional disregard for safety” is as difficult a concept as obscenity to define.

Community Standards. Maintenance ASAP ERC members defining “intentional disregard for safety,” on a case by case basis while exercising risk-based philosophy of error management, are applying their "*community standards*" -- just as in the area of pornography for jurors, "community standards" are the standards of the area "from which [the juror] comes for making the required " definition of obscenity (Hamling v. United States, 418 U.S. 87, 105; 1974).

The Survey. Nineteen maintenance cases were derived from public files, such as the NASA Aviation Safety Reporting System (ASRS), which illustrate deviation from 14 CFR (violations) or from safe practice (at-risk behaviors). If there is no apparent violation of 14 CFR, unsafe practice can be assumed by virtue of the self-report being voluntarily submitted to ASRS by the reporter. Both potential violations and risk-based cases selected and used included some aspect of direct “social pressure,” or the indirect effect of social norms within the existing social context. All 19 scenarios were selected

and developed as potential comparison-points to the exclusionary case illustration in AC 120-66B (FAA, 2002; p 13). That case - - describing a mechanic's use of a substitute engine valve lubricant at the direction of his/her immediate supervisor, with full knowledge of both parties that the lubricant was not authorized in the maintenance manual - - illustrates a non-sole-source report that the ERC concluded involved an intentional disregard for safety warranting referral of the event to the FAA for possible enforcement action against both the reporting employee and his/her supervisor. If community standards in maintenance match the standards of those who created the case illustration in AC 120-66B, then this study should reveal that, by showing exclusion for similar applications of social pressure for unsafe maintenance practices known by one or both parties.

Survey data and the analysis. Data were collected during late 2003 and early 2004 from 19 individuals who comprised about two-thirds of the nationwide population of Maintenance ASAP practitioners and those currently developing a Maintenance ASAP program. Those data were examined to better understand the community standard for intentional disregard for safety. The results show that intentional disregard for safety was not seen to be a factor, by most of the survey respondents in any of the cases. In other words a community standard was revealed that seems to directly counter the exclusionary illustration in AC 120-66B.

Selection and development of the training scenarios. The data analysis showed that seven of the 19 scenarios would be most appropriate candidates for inclusion in ASAP training for ERC members. That selection was based on the content of the scenarios (acquiescence to supervisory pressure); as well as on their ability to elicit

variability in response, while at the same time retaining the overall community standards for protected disclosure and organizational learning within this social context.

The Research

Research Question: “How acceptable to ASAP are those maintenance human errors, caused by pressure in the system (e.g., from supervisor, from coworkers, from management, or from standard norms of “how we do things around here”).

Our study permitted testing the following specific parts of that question:

1. *Concept:* Do the roles taken by the ERC members influence acceptability of mistakes and violations Aviation Maintenance Technicians (AMTs) report to an ASAP program?
 - a. *Operational Definition:* Are there intergroup differences between management, union and FAA representatives in their responses to the scenarios?
2. *Concept:* What is the acceptability of mistakes and violations Aviation Maintenance Technicians (AMTs) report to an ASAP program when they report that act was influenced by expectations from supervisor or management, from Lead Mechanics, or from coworkers for normative or typical behavior?
 - a. *Operational Definition:* What is (are) the dominant response(s) to all of the scenarios?
 - b. *Operational Definition:* Are there differences in response to the individual scenarios?
 - i. How much unanimity among respondents (Rs) is there for each scenario?
 - ii. What characterizes those scenarios for which unanimity is higher?
 - c. *Operational Definition:* Are there patterns of individual response to scenarios illustrating certain kinds of social expectation or pressure?

Method

Instrument: A 19 item multiple choice survey was constructed. Each item provided a variation of a hypothetical AMT's submission to a maintenance ASAP program. These hypothetical submissions, or scenarios, were developed from cases found in the public files of NASA's Aviation Safety Reporting System (ASRS), or in the public archives of the US National Transportation Safety Board (NTSB) and are intended to represent realistic scenarios. All these scenarios represent some version of a mistake or human error within a direct social context. These social situations include communication (usually in form of instruction) to the AMT from his/her management supervisor and/or maintenance control supervisor, or coordination (or its lack) with other AMTs (sometimes including a Lead Mechanic) working on the same task. Of the eleven original cases, four of those cases were used "as is" for ASAP scenarios. Six of the eleven cases were provided a second ending, in addition to the "as is" conclusion of each case. One case was given two additional endings. The eleven original cases, plus the eight alternate endings produced a total of 19 individual potential ASAP scenarios. The additional endings usually took the form of the AMT reporter 1) questioning a supervisor's request that he/she sign off the repair as airworthy, but then signing; or 2) having "second thoughts" after acquiescing to the directive, or 3) refusing to sign as airworthy. Two other alternate endings had the AMT reporter offering a reason why he/she thought the mistake in the case was made.

The reason why most alternative endings were used was to examine the effects of signing under protest, refusing to sign, and signing with later misgivings. It was reasoned that ASAP programs should engender trust and AMT confidence in open communication

within maintenance. If that was true, then ASAP reports of 1) having “second thoughts about the wisdom of signing for a job, 2) protesting a supervisor’s instruction to sign for an unsafe act, and 3) challenging supervisor’s instruction by refusing to sign, might be forthcoming. The survey thus examined whether such scenarios would be accepted under ASAP.

Before each scenario there was a question, “Was there an intentional disregard for safety?” Respondents were asked this question repeatedly in order to frame their answers in terms of the “community standard” (if there was one) for a risk-based philosophy. Respondents were not instructed further in how to answer, but they were assumed to be familiar with and capable of applying rule-based criteria (e.g., delay in reporting, sole source, etc.) as well, if they wished to do so.

Each of the 19 scenarios required “respondent”, in his/her hypothetical role of a member of an ASAP Event Review Committee (ERC), to choose one of four actions:

- Accept that report into the ASAP program as a self-disclosure of a possible violation of 14CFR, for determining further action;
- Accept that submission as a specific or general safety concern, for possible use identifying a system safety hazard. [This action choice is based on language in AC120-66 (Item 10, “ERC Process,” *cf.*, FAA, 2002, Appendix 1, p.5) that states that among the reports an ERC might expect, would be those of a “general safety concern” that may or may not include a violation of regulations.]
- Table it pending more information;
- Reject or exclude it, -- not allow the submission to be considered under the program.

For each scenario there was also space where the R could provide written comments about the case, or about his/her answer to it.

The survey is included here as Appendix A.

Administration. During October 2003 the survey form was submitted to the NASA ARC Human Research Institutional Review Board for approval. On November 18 the board authorized the survey for use in research activities. Thereafter, the survey was posted on the Internet [cf., <http://mrm.engr.scu.edu/actionsurvey.html>] for rapid and efficient data collection and analysis. The survey was anonymous, although respondents were asked to indicate whether they were answering from the point of view of an ERC member who represented management, the regulator, or an employee group or trade union. They were not asked any other personal information which might identify them later.

Sample. The sample needed to be comprised of individuals with ample knowledge of maintenance ASAP rules as specified in FAA Advisory Circular 120-66, and who have the perspective of an ASAP user (as distinct from an ASAP policymaker). Thus the population was all individuals who have direct experience with administering a maintenance ASAP program of their own, or who are currently developing such a program. Since there were few maintenance ASAP programs (either in place or in development) in the U.S. during 2003 this population is small – probably numbering no more than 35 to 40 people. The potential respondents for the present study were 18 individuals of my direct acquaintance, plus six others who were introduced to me during the study. These were people with profound ASAP knowledge and represented up to

two-thirds of that population at that time. They came from airline maintenance management, AMTs' trade unions, and FAA CMOs.

During October 2003 I visited or telephoned all 18 of the first set of individuals in the potential sample respondents and explained my study. I asked each one if they would be willing to provide me with an email address that I could use to send them the URL for the survey. They all agreed to review the scenarios and respond to the survey if they felt comfortable doing so. During December the 18 potential respondents from five airline maintenance organizations were formally invited to complete the web-based survey. Seven responses were received during December. As a follow-up, the same invitation was made again to the same 18 in January. Seven more completed surveys were received, for a total of fourteen during December 2003 and January 2004. This represented a response rate of 77%.

In April 2004 I telephoned the manager of a sixth airline's maintenance ASAP program. I described the study and asked him to endorse the survey to his ERC and their alternates. During May five respondents submitted their surveys, raising the overall sample size to 19 and the return rate to 78%.

The total sample consists of six maintenance management representatives, five FAA inspectors, and eight trade union representatives.

Quantitative Results

Dominant responses. The following section describes the results obtained from all 19 multiple-choice questions. Table 1 displays the overall summary results in terms of percent responses to each of the four multiple choice answers.

Table 1

Summary Percentages, All Scenarios, Dec-Jan Sample (n=19)

<i>Scenario #</i>	<i>% Accept as Event</i>	<i>% Accept as Hazard</i>	<i>% Reject</i>	<i>% Delay for additional information</i>
1	42	21	11	26
2a	37	26	5	32
2b	53	16	5	26
2c	47	16	5	32
3a	90	-	10	-
3b	74	5	5	16
4	44	28	-	28
5a	61	-	22	21
5b	50	11	17	22
6a	94	-	6	-
6b	94	-	6	-
7	56	28	6	11
8	61	-	17	22
9a	33	22	17	28
9b	39	28	22	11
10a	39	22	17	22
10b	28	28	16	28
11a	50	22	6	22
11b	39	33	5	22

It will be seen from Table 1 that percentages in the first response column, “Accept as Event,” are typically higher than the other choices. That column, together with percentages in the second column, “Accept as Hazard,” sum to no less than 56% for each one of the 19 scenarios. Note also that percent “Reject” reaches as much as 22% for only two scenarios. These results provide *prima facie* evidence for a community standard of accepting errors caused by (or at least accompanied by) social pressure.

Another way of presenting these dominant responses is to sum the raw data contributing to the results for each of the columns in Table 1 and to calculate the overall percentages for each of the four response choices. Those results are as follows. Over all scenarios and respondents, “Accept the report as a safety event” was the most frequent (n=187, 54% of total) response. “Table the report for more information” was a distant second (n=68, 20% of total). Third in order was “Include it as a hazard report” (n=56, 16% of total), and “Reject this report” was last (n=35, 10% of total). These findings suggests that for most of these respondents, most of the time, these 19 scenarios are largely clear – either “Reject” (10% of the time), or “Accept” (70% of the time, combining individual Event Reports and Hazard information). For 20% of the total responses received, the information was incomplete or ambiguous enough to warrant further investigation (“Table it”).

Intergroup differences across all scenarios. A Chi-Square test was applied to the proportion of each choice-point selected by each of the three respondent groups (Managers, Regulators, and Employee Representatives) represented in the present sample. Only two statistically significant differences ($p < .05$) were found among the 19 scenarios (#3a, 11a). Closer examination shows that among the three groups, the Regulator Representatives are slightly more likely to reject scenario 3a. On the other hand, scenario 11a is called a “hazard report” by a disproportionate number of Employee Representatives. Open ended comments to scenario 11a reveal that “event report” should probably have been used instead. These two results may be statistical anomalies rather than important distinctions among the three groups of ERC representatives. Thus the overall pattern suggests that Managers, Regulators, and Employee Representatives, as

groups, do not respond differently to the scenarios (or to most of the scenarios) presented to them.

Differences Among the 19 Scenarios

Those scenarios for which there was the most agreement were those involving mistakes made while working with other AMTs. Those with the greatest disagreement were scenarios which involved some degree of supervisory pressure.

Scenarios with highest agreement. Over a quarter of the scenarios (5/19) show extremely high agreement for acceptance. Frequency counts item by item across the 19 scenarios show two (#6a-b) have almost complete unanimity (18/19 respondents accept the safety report), one (#3a) has 17 accept, and two more (#3b & 7) have acceptance by 15 respondents (either as Individual Reports or Hazard information). These five scenarios all deal with sign-off errors made by relying on a work mate to determine the correct part or procedure under time pressure. These five scenarios may be characterized as “honest mistakes, owned up to by the reporters.”

The remaining 14 scenarios also received reasonably high acceptance, but somewhat lower than the five previously described.

Scenarios #11a, & 11b had high acceptance (n=13, or 72%, of respondents accepted them either as “Event Reports” or “Hazard Reports”) and 11a and b each received one outright rejection plus four requests for more information. Those cases involved an AMT who, after performing inspection or repair, felt uneasy about the aircraft flying without written confirmation from engineering. Scenario #1 received 12 acceptances, two outright rejections plus five requests for more information. This case

was about an inspector who was concerned that his/her name was on the airworthiness of an aircraft that he/she wanted to undergo further checks. These three scenarios may be characterized as “management or system errors.”

One scenario (#4) involved an AMT signing off repairs, which by inference also included results of prior poor practice -- and because of which, failed to pass inspection. This case received high acceptance by 13 respondents (72%). Comments suggested that the reported had not violated 14 CFR. Five respondents chose “table it” and their comments indicated they would want to invite management to explain the prior repairs.

Another scenario (#8) was concerned with an AMT who had received an FAA Letter of Investigation (LOI) after signing off an aircraft which had an air turnback because of the repair. This case received high acceptance (12 respondents or 61%), but four respondents chose “table it” and three respondents rejected it outright. Written comments supporting the rejections mentioned that having waited for the LOI the reporter was outside the time limits for submission (a rule-based decision).

Scenario cases 9b and 10b both involved situations where an AMT refused to sign for airworthiness. One of them 9b received high acceptance (n=13, 63%), but also received four rejections. Examination of the comments for 9b showed that two of the rejections were aimed at the supervisor who signed, not at the AMT who reported it. Scenario 10b received 10 acceptances (56%), three rejections and four requests to table it. In this case there were very few comments written and none of them discussed the rejections.

The remaining seven scenarios (2a-c, 5a-b, 9a, 10a) all dealt with the issue of supervisory pressure and AMTs acquiescing to it. This “pressure” to sign for work resulted in several different outcomes -- the submitter either claimed to have protested at the time he/she signed (2b, 5a, 9a, 10a); had signed and later had misgivings (2a, 5b) or had refused to sign and another AMT had done so (2c). It is important to note that even these seven scenarios received a clear majority of acceptance under the ASAP rules as interpreted by the present sample of informed and knowledgeable maintenance professionals. Two of these seven cases (2a, 2c) received acceptance from 63% of the respondents and were rejected by only one respondent each (5%). The others had slightly lower rates ranging from 61% (5a,5b,10a) to 56% (9a). The reject rates also varied from 5% to 22% and the comments ranged from “Intentional disregard [for safety]” to, “The technician knowingly did what he was asked to do. Definitely lack of assertiveness,” and “The mechanic knew what he was doing was not correct but still did it.” This distinction between nearly two-thirds accept to nearly one-quarter reject for these cases provides the variability to promote good discussion during ASAP/ERC training while at the same time promoting support for the community standard of what is not intentional disregard for safety.

Qualitative Results

In total, survey respondents wrote comments 34 percent of the time. That is, in 118 of the 346 possible opportunities to do so (19 respondents x 19 scenarios, less 15 times questions were not answered) respondents wrote comments. In nearly every case, these comments explain or expand the multiple-choice answer respondent gave. In an

overwhelming number (some 95%) the comments confirm the multiple-choice response and show a comprehensive understanding of the ASAP intention and process.

Comments indicating “false negatives.” In those few (6) remaining cases the comments reveal ambiguity in the case scenario itself, or just random error. These comments describe the intention to accept a scenario (either as a “safety hazard report” or “event report”) or “table it,” despite check-marking the “reject” answer. Most of these illuminating comments were in response to scenarios dealing with supervisors placing pressure on AMTs to agree to sign for work the latter believe to be incomplete or incorrect. These comments said something like, I reject the AMT’s submission, because the supervisor [“...is at fault”], or should be...[“...interviewed to get their side of the story”], or [“...asked to submit their own ASAP event about this case”]. This clear discrepancy between what an respondent check-marked and what he/she said in associated comments can be considered a misunderstanding, or mistake. These few “mistakes” in check-marking an answer were all in the direction of “false negatives” – so, if anything, the large acceptance of the 19 scenarios revealed by the quantitative results is slightly strengthened by the “accepting” comments written in by the respondents written in association with selecting the “reject” choice.

Implications for Training

The results on acceptance of these 19 scenarios confirm that any and all of them reflect acceptability under community standards for protected disclosure under aviation maintenance ASAP. Thus any of the scenarios could be used to heighten the appreciation of present and potential ERC members to the complicating effects of social context in risk-based decisions regarding ASAP event submissions.

The Three ASAP Roles. Furthermore the results suggest that there are few differences in the acceptance threshold of regulator, management and employee ERC representatives in the present sample. The three groups respond to these scenarios in much the same manner and can be considered together for the purposes of community standards. Whether these three groups might be more effectively trained, using these scenarios, within their own groups, or with the other groups cannot be answered with the data here.

Which scenarios to use? What is of interest for the present study is exploring the possibility of ERC confusion caused by the example of an excluded case in AC 120-66B, in which a supervisor directs a mechanic to use an available lubricant , which is known to them both to be incorrect (FAA, 2002; p 13). For present training purposes then, an efficient approach would be to limit the number of scenarios to those most similar to that case in AC 120-66B, and which display enough response variability in the present sample to insure spirited discussion among ASAP trainees. Seven scenarios (# 2a, 2b, 2c, 5a, 5b, 9a, and 10a) fit those criteria.

Modifying the scenarios for use in training. The training method chosen here takes the form of interactive discussion familiar in adult learning. Specifically the training using these scenarios would take the form of individual pre-work, followed by small group discussion, then summarized (either by trainees or trainers) for lessons learned and affirmation by the participants. Appendix B contains the seven scenarios, as training cases, plus written instructions for training.

Conclusion

ASAP scenarios have been developed from publicly available aviation maintenance safety cases. These scenarios have been tested with respondents in Air Carriers and FAA CMOs who belong to Maintenance ASAP ERCs or are currently planning to implement a Maintenance ASAP program. The scenarios have proven realistic and appropriate to the respondents. There is agreement, across management, FAA, and trade union respondents, that real cases like these scenarios should be included as ASAP self-disclosure events (or as safety hazards) to provide organizational learning and improvement in risk management.

Most of the scenarios developed for this study are suitable for use in Maintenance ASAP training. A subset of seven cases has been chosen as particularly relevant to the issue of supervisory pressure on AMTs. These scenarios have been edited and expanded to act as stand-alone training materials for use in educating ERC members.

There are issues that lie outside this report. For one, the results reported above do not prove that these maintenance ERC members can recognize and agree when they see non-inadvertent disregard for safety. What is reported above is not a full examination of acceptance-rejection criteria for maintenance ASAP. Only one-half of the picture (albeit an important one) has been discovered here. Perhaps the future will bring further research that specifies the community standards for ASAP rejection as well as acceptance.

The results above do show is that we are beginning to understand the “community standards” in aviation maintenance that deal with “unintentional disregard for safety.” There is little doubt that these respondents certainly knew it when they didn’t see

intentional disregard for safety – or they were willing to risk giving the reporter the benefit of the doubt.

References:

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Appendix A: The Survey

ASAP SURVEY PARTICIPATION

We are studying the type of incidents that are accepted in Maintenance Aviation Safety Action Partnership (ASAP) programs. This study is being conducted under the NASA Aviation Program. Your professional experience is invaluable in helping us understand the line between acceptable and unacceptable cases and how the best maintenance information can be collected through ASAP. We value your participation.

There are no risks in participating in this survey. However, you should know that your participation is voluntary and that if you decide not to participate in this study, or any part of the study, at any time, it will not affect your relationship with the airline that employs you, your union, or NASA. All information provided by you will remain anonymous and confidential. *We do not ask for nor should you include any personal information with your responses* (this includes your name, your airline, your location, employee number, etc.). Final results of this study may be published but *your individual responses will remain anonymous and confidential*. Final results will also be available to you upon request. If you wish to communicate with me directly, my email is below.

Thank you for your time and effort in helping us with this study. It is genuinely appreciated! Your knowledge and experience has the potential to benefit the industry by influencing future training and operating guidelines.

Sincerely,

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ASAP SURVEY: *INSTRUCTIONS*

Following, you will find a set of 11 case scenarios written in the form of ASAP report. You will see that some of the case scenarios have at least one variation. I ask you to consider each version of each case for its applicability to an ASAP program that your organization would sponsor. To answer these questions typically requires only 10-15 minutes of your time and your feedback will provide us with unique and meaningful data for recommending training and operations standards for the industry.

ASAP SURVEY: *BACKGROUND INFORMATION*

Before getting started evaluating the case scenarios, please tell us which part of the ASAP partnership you would represent by selecting the appropriate choice below

Commercial Airline employing mechanics_____

Repair Station employing mechanics ____

Trade Union or Employee Group representing mechanics ____

Regulator ____

ASAP SURVEY: CASE STUDIES

Case Study #1

1. Intentional disregard for safety? I was working on the C-check for a B737-300. Yesterday I was assigned a routine inspection of the horizontal stabilizer jackscrew and gimbal. Although the wear was well within limits (.020") I wrote up a non-routine because of metal particles I noted on the jackscrew. After I went home my supervisor called to ask me if the metal debris I wrote up was sheet metal from a previous modification or drill bit shavings. I said it could be, but I was not sure – this is why I made the write-up. Supervisor then used my name as a ref. to sign off the non-routine card saying I said it was sheet metal debris. I did not give him permission to use my name or say I said it was sheet metal debris. He had not gotten my permission to use my name as a reference. They also did not do further inspection on gimbal/jackscrew for damage or perform an ops check for airworthiness.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #1?

Please choose only ONE:

- a) Accept it into your ASAP program as a safety event report _____
- b) Accept it into your ASAP program it as a safety hazard report _____
- c) Table it while more information is collected _____
- d) Reject it as unacceptable for ASAP _____

2. Intentional disregard for safety? I am an inspector with six years experience on third shift heavy maintenance at XXX. I was working on an MD80, assigned a routine inspection of the elevator jackscrew nut. It measured just within wear limits (.035" < .040"). I wrote up the discrepancy and called for replacing the part. The next day my supervisor asked me to take additional measurements (because the first one was so close) and my measurements still remained within wear limits (.034" - .037") . And...

[Ending A:] ...at my supervisor's instruction I signed the task card as airworthy, but I am now concerned that the wear tolerance won't allow continued safe flight until next regular inspection in two years.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #2A?

CHOOSE ONE:

- Accept it into your ASAP program as a safety event report _____
- Accept it into your ASAP program it as a safety hazard report _____
- Table it while more information is collected _____
- Reject it as unacceptable for ASAP _____

[Ending B:] ...at first I didn't want to change my discrepancy calling for replacing the part, and I tried to explain why, but at my supervisor's instruction I signed the task card as airworthy.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #2B?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

[Ending C:] ...I refused to sign the task card as airworthy, but my supervisor asked another mechanic to measure it again and sign it off. I am still concerned that the wear tolerance won't allow continued safe flight until next regular inspection in two years.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #2C?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

3. Intentional disregard for safety? My lead and I were called to a through flight for a #2 tank xfeed problem on a 727-200. We noticed that the switch on the FE's panel would not open or close the valve – it was stripped out. As we called to get dispatch approval per MEL, I proceeded to remove the cannon plug on the x-feed valve. Remembering the switch on the FE's panel being in closed position I moved the valve manually to the opposite side and lock wired it, but before I did this my lead ran up to the cockpit to verify that it was the valve to be deferred per MEL. My lead was taking care of the paperwork while I was finishing up. The plane was dispatched, but 30 minutes out they turned back not being able to fuel #1 and #3 engines with #2 tank. The problem being the valve was lock wired closed. And...

[Ending A:] ...I feel that this problem was caused because of the rush and pressure of a through flight.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #3A?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

b) Accept it into your ASAP program it as a safety hazard report _____

c) Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

[Ending B:] ...I feel that this problem was caused by not reading the whole procedure of the MEL. A very important part was missed – to transfer fuel out of the #2 tank to verify that the valve was in the open position.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #3B?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

4. Intentional disregard for safety? I am an A&P mechanic working in the fiberglass/composites shop. I have 11 years with the company and 18 months in the shop. I repair DC9 radomes, tail cones, ADF and VOR antenna. I have informed Shop management, the company's training personnel and QA about the use of unapproved methods in our shop, and have been directed by them NOT to remove repairs done in the past, by someone else, that I felt had been done improperly. These repairs are leading to failures in Radomes when they are tested for radar transmission efficiency. Radome serial number xxxx is one such, it was recently repaired by me and it failed in the test shop in places other than the place I repaired. I heard that management has released this radome to service because the location of the flaws in the radar presentation to the pilot. My repairs did not contribute to that failure. It failed the test because of unapproved methods done before by others in the shop. Management has even brought in the manufacturer's engineer to approve the present method and revise the SRM. This request was denied by the manufacturer, as I understand it, because the present unapproved repair allows no damage tolerance and would be a problem with a rear engined aircraft.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #4?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

5. Intentional disregard for safety? The LMP of this B757-200 had been downgraded to “Not CAT II” due to right autopilot and thrust management on MEL. On day 10 of the MEL I fixed the autopilot yet the thrust management system remained unrepaired. I was instructed by management to clear the placard and reissue it using the authority to restart the clock. And...

[Ending A:] ...I did it, but under protest. I told them that this is in violation of GPM XX-xx, page x.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #5A?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

[Ending B:] ...although I did it, I was uncomfortable that maybe I was non-compliant with the letter of the MEL.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #5B?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

6. Intentional disregard for safety? Clearing MEL for “No Heat Light” on TAT (DADC) probe for a 737-400. I installed wrong part # that was given to me by my lead (he read it from the old part removed). Aircraft was dispatched, but air turnback with “B” Autopilot problem, which I deferred. After a/c departed 2nd time I rechecked effectivity screen and realized the probe I replaced was the wrong one. I notified MtcControl and correct part was installed on next leg and “B” autopilot squawk was cleared. And...

[Ending A:] ...I thought the p/n was checked and in the rush of clearing the MEL on a through flight a lack of communication caused an error.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #6A?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

[Ending B:] ...my lead later told me that the p/n he obtained from the old part was almost unreadable and in the rush of clearing the MEL on a through flight a lack of communication caused an error.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #6B?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

7. Intentional disregard for safety? Day shift through flight. Yesterday, myself and another mechanic changed nose wheel tires on a B737 while our Lead checked parts tags for both tires and completed log book entry. We were in a hurry to get the a/c out and both of us mechanics failed to notice that the tires were different and the lead failed to notice that although the parts numbers were the same for the wheels, the tires had different parts effectivity for different versions of the 737. The aircraft was dispatched with one incorrect tire, which the captain noticed before departing on the next leg. The foreman told us about the error today.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #7?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

8. Intentional disregard for safety? I am a lead mechanic on the line at XXX. We received an air return of a 737 with #2 Engine Heat Light on. Light came on for less than a minute. Another AMT and I looked for loose or leaking ducts and fouled/rubbing overheat sensors, but found nothing. Subsequent power run up OK, and no 30 day history of “air return,” so I cleared logbook and dispatched the aircraft. Problem recurred after takeoff. Later, on third shift, another AMT found 9th stage duct leak because clamp was missing its bolts, gasket, and safety wire. I’ve been sent a LOI because I signed the logbook to clear the aircraft.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #8?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

9. Intentional disregard for safety? Today an Airbus A320 arrived at our station with a totally deflated nose landing gear strut. History showed identical condition at previous station where “quick service” was performed. Maintenance manual requires full service at next maintenance opportunity. Aircraft was scheduled for light service at our station. Flight was delayed for strut service. Myself and another mechanic believed full service was required, but station maintenance manager insisted that we only perform a “quick check.” Strut was serviced with nitrogen and released and dispatched. And...

[Ending A:] ...although the other mechanic and I protested to our supervisor, I did sign off the logbook

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #9A?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

[Ending B:] ...the other mechanic and I refused to sign the logbook, so the supervisor signed it off

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #9B?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

10. Intentional disregard for safety? A DC9-40 was being converted to all cargo configuration and I was the inspector assigned to this a/c on day shift. Maintenance was working an engineering authorization (EA). At about 1415 hours it was decided to stop work on this job due to the shift ending. I suggested that maintenance complete a job pass-down form as required by the GMM when the work procedure is interrupted. The maintenance supervisor objected and wanted to sign the steps we had completed. I explained that I could not stamp steps 5a through e as those steps configured the a/c for the test, and was not repeated anywhere on the EA. We then went to the second shift inspection supervisor who agreed that a job pass-down should be used. The maintenance supervisor then said he would hold the EA and have none of it inspected rather than attach a job pass-down to it. At that point the inspection supervisor did a turn-about and heavily pressured me to stamp off the work steps for the a/c configuration. And...

[Ending A:] ...after protesting about it I did stamp the a/c configuration and a job pass-down was not used.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #10A?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

[Ending B:] ...I refused to stamp off the a/c configuration and the inspection supervisor did it.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #10B?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

11. Intentional disregard for safety? On July XX a DC-10 30 XYZ inbound with discrepancy, “DIRECTIONAL CTL PANEL HDG DISPLAY DIGITS OUT OF SEQUENCE.” After ordering the correct part number, part was not available. I was told by maintenance control to rob the panel from a/c YMZ. That panel had a different p/n and showed not interchangeable with a/c XYZ. Me, and the supervisor on duty, discussed the situation with maintenance control. Maintenance control in turn decided to get engineering involved and after a while my supervisor was told that the panel from a/c YMZ was applicable for a/c XYZ. I installed the part and performed the ops check and all checks were good. And...

[Ending A:] ...I signed it off and the aircraft was returned to service. I have asked my supervisor to see the engineering approval for the part interchangeability, but he hasn't seen it either. It's been 2 weeks now and a/c XYZ has flown without flt guidance panel problems, but it may be out there with an unapproved part.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #11A?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

[Ending B:] ...I refused to sign it off, so the supervisor did. It's been 2 weeks now and a/c XYZ has flown without flt guidance panel problems, but I'm concerned that it may be out there with an unapproved part.

If you were a member of an ASAP Event Review Committee (ERC), what would you vote to do with report #11B?

CHOOSE ONE:

Accept it into your ASAP program as a safety event report _____

Accept it into your ASAP program it as a safety hazard report _____

Table it while more information is collected _____

Reject it as unacceptable for ASAP _____

Appendix B: Maintenance ASAP Risk-Based Decision Training Materials

Part I. Introducing the Concepts of “Risk-Based” Decisions, and “Community Standards” in Maintenance ASAP. 20 Minutes

The trainer begins a 20 minute lecture module with a summary of “rule-based” and “risk-based” criteria for ASAP decisions.

This is followed by an introduction to “community standards” for ideas important to a community (such as aircraft maintenance), but which are difficult to define. Prime example in ASAP is “intentional disregard for safety.” Even though such an idea may be difficult to formally define, community members will “know it when we see it.”

Finally, the Trainer summarizes (the present) NASA research into community standards for risk-based decisions in aviation maintenance ASAP.

Part II. Individual pre-work – “on your own.” 20 Minutes

Here are seven examples of possible cases you may see in your role of member in your Maintenance ASAP Event Review Committee (ERC). Read each case and mark your answer to it before going on to the next one. After you have read and responded to all the cases you will have a chance to discuss the cases with other members of today’s class.

A The LMP of this B757-200 had been downgraded to “Not CAT II” due to right autopilot and thrust management on MEL. On day 10 of the MEL I fixed the autopilot yet the thrust management system remained unrepaired. I was instructed by management to clear the placard and reissue it using the authority to restart the clock. And...

[Ending for Case A-1:] ...I did it, but under protest. I told them that this is in violation of GPM XX-xx, page x.

As a member of the ASAP Event Review Committee (ERC), what would you vote to do with report A1?

CHOOSE ONE:

- ☐ Accept it into your ASAP program as a safety event report
- ☐ Accept it into your ASAP program it as a safety hazard report
- ☐ Table it while more information is collected
- ☐ Reject it as unacceptable for ASAP

[Ending for Case A-2:] ...although I did it, I was uncomfortable that maybe I was non-compliant with the letter of the MEL.

As a member of the ASAP Event Review Committee (ERC), what would you vote to do with report #A2?

CHOOSE ONE:

- ☐ Accept it into your ASAP program as a safety event report
- ☐ Accept it into your ASAP program it as a safety hazard report
- ☐ Table it while more information is collected
- ☐ Reject it as unacceptable for ASAP

Case B. Today an Airbus A320 arrived at our station with a totally deflated nose landing gear strut. History showed identical condition at previous station where “quick service” was performed. Maintenance manual requires full service at next maintenance opportunity. Aircraft was scheduled for light service at our station. Flight was delayed for strut service. Myself and another mechanic believed full service was required, but station maintenance manager insisted that we only perform a “quick check.” Strut was serviced with nitrogen and released and dispatched. And although the other mechanic and I protested to our supervisor, I did sign off the logbook

As a member of the ASAP Event Review Committee (ERC), what would you vote to do with report B?

CHOOSE ONE:

- ☐ Accept it into your ASAP program as a safety event report
- ☐ Accept it into your ASAP program it as a safety hazard report
- ☐ Table it while more information is collected
- ☐ Reject it as unacceptable for ASAP

Case C. A DC9-40 was being converted to all cargo configuration and I was the inspector assigned to this a/c on day shift. Maintenance was working an engineering authorization (EA). At about 1415 hours it was decided to stop work on this job due to the shift ending. I suggested that maintenance complete a job pass-down form as required by the GMM when the work procedure is interrupted. The maintenance supervisor objected and wanted to sign the steps we had completed. I explained that I could not stamp steps 5a through e as those steps configured the a/c for the test, and was not repeated anywhere on the EA. We then went to the second shift inspection supervisor who agreed that a job pass-down should be used. The maintenance supervisor then said he would hold the EA and have none of it inspected rather than attach a job pass-down to it. At that point the inspection supervisor did a turn-about and heavily pressured me to stamp off the work steps for the a/c configuration. And after protesting about it I did stamp the a/c configuration and a job pass-down was not used.

As a member of the ASAP Event Review Committee (ERC), what would you vote to do with report C?

CHOOSE ONE:

- ☐ Accept it into your ASAP program as a safety event report
- ☐ Accept it into your ASAP program it as a safety hazard report
- ☐ Table it while more information is collected
- ☐ Reject it as unacceptable for ASAP

D. I am an inspector with six years experience on third shift heavy maintenance at XXX. I was working on an MD80, assigned a routine inspection of the elevator jackscrew nut. It measured just within wear limits (.035" < .040"). I wrote up the discrepancy and called for replacing the part. The next day my supervisor asked me to take additional measurements (because the first one was so close) and my measurements still remained within wear limits (.034" - .037") . And...

[Ending Case D-1:] ...at my supervisor's instruction I signed the task card as airworthy, but I am now concerned that the wear tolerance won't allow continued safe flight until next regular inspection in two years.

As a member of the ASAP Event Review Committee (ERC), what would you vote to do with report D1?

CHOOSE ONE:

- ☐ Accept it into your ASAP program as a safety event report
- ☐ Accept it into your ASAP program it as a safety hazard report
- ☐ Table it while more information is collected
- ☐ Reject it as unacceptable for ASAP

[Ending Case D-2:] ...at first I didn't want to change my discrepancy calling for replacing the part, and I tried to explain why, but at my supervisor's instruction I signed the task card as airworthy.

As a member of the ASAP Event Review Committee (ERC), what would you vote to do with report D2?

CHOOSE ONE:

- ☐ Accept it into your ASAP program as a safety event report
- ☐ Accept it into your ASAP program it as a safety hazard report
- ☐ Table it while more information is collected
- ☐ Reject it as unacceptable for ASAP

[Ending Case D-3:] ...I refused to sign the task card as airworthy, but my supervisor asked another mechanic to measure it again and sign it off. I am still concerned that the wear tolerance won't allow continued safe flight until next regular inspection in two years.

As a member of the ASAP Event Review Committee (ERC), what would you vote to do with report D3?

CHOOSE ONE:

- ☐ Accept it into your ASAP program as a safety event report
- ☐ Accept it into your ASAP program it as a safety hazard report
- ☐ Table it while more information is collected
- ☐ Reject it as unacceptable for ASAP

Part III. Small group discussion. 25 Minutes

You will now join the other members at your table to discuss one of these seven ASAP cases. Your instructor will tell you which case your group will work on first. Your instructor will also appoint three of you as ERC members (the others are “alternate” members and will not participate in the discussion itself). The ASAP Manager in each group will chair the discussion and report to the class what the decision was. The result of this group discussion will be a joint decision on the action that the ERC will take. That decision will be reached by consensus (no “majority rules” votes, no “horse trading”). Your group will have 15 minutes for discussion and consensus. The ASAP manager will have five minutes to announce and explain the decision reached to the class as a whole.

Before the group begins you will choose support roles for the “alternate” members. First of all, choose a “scribe” – someone who will keep notes on the flip chart provided. Next choose a “timekeeper.” Finally choose an “observer” who will comment on the group’s process. After the ASAP Manager has explained the decision reached, the observer will have 5 minutes to report back to the class on how the discussion progressed as well as what went well and what went poorly.

Part IV. The Large Group Discussion. 25 Minutes

After all the small groups have presented their decisions and their process, the Trainer opens the floor to questions and comments. The Trainer lists those comments on flip chart. The Trainer then summarizes the issues and concerns that are reflected in the larger groups.

The Trainer asks if there are other concerns/issues that have not yet been raised. Those are listed separately on flip chart.

Finally the Trainer combines the decisions presented from the small groups, with the large group's issues, and relates these to the results of the NASA research. The Trainer gains consensus from the larger group about accepting ASAP cases dealing with possible supervisory pressures for improving organizational learning and proactive safety management.